

REMARKS

Upon entry of the instant amendment, claims 1, 2, 4-6, 8-23 will remain pending in the above-identified application and stand ready for further action on the merits, with claims 4 and 9 being withdrawn from consideration based on an earlier restriction requirement of the Examiner.

In this Amendment, claims 1 and 6 have been amended to recite limitations previously recited in claim 3 and claim 7, respectively (and claim 3 and 7 have been canceled to prevent a redundancy with amended claims). Claim 8 has been amended to depend upon claim 6 instead of canceled claim 7.

New claims 11-23 have been added. Support for the newly added claims can be found, for example, in the following sections of the present specification:

claim 11: page 14 line 23 to page 19 line 14, Examples 1-11;

claim 12: page 15, lines 5-8;

claim 13: page 15, lines 21-24;

claim 14: page 15, lines 24-27;

claim 15: page 16, lines 5-21;

claim 16: page 16, lines 22-28;

claim 17: page 15, lines 19-21;

claim 18: page 15, lines 15-19;

claim 19: page 16, lines 30-32;

claim 20: page 17, lines 2-4;

claim 21: page 18, lines 15-22;

claim 22: page 17, lines 4-6;

claim 23: page 18, lines 27-28.

Accordingly, the present amendments to the claims do not introduce new matter into the application as originally filed. As such, entry of the instant amendment and favorable action on the merits is earnestly solicited at present.

Restriction/Election

In the Office Action, claims 4, 5 and 9 are withdrawn from consideration.

However, in the Restriction Requirement of October 29, 2008, the Examiner required election in the present application between:

Group I, claims 1-3, 5-8 and 10, drawn to a fiber and fabrics comprising a blend of highly fusible polyurethane fibers and non-elastic fibers; and

Group II, claims 4 and 9, drawn to a method of forming highly fusible polyurethane elastic fibers.

(Emphasis added)

For the purpose of examination of the present application, Applicants elected Group I, Claims 1-3, 5-8 and 10 in the response filed November 21, 2008.

Thus, claim 5 should be rejoined. Applicants respectfully request rejoinder of claim 5.

Specification Amendments

The specification has been amended to replace the term “grinning” to “corrugation” to further clarify features of the present invention (by correcting mistranslation).

Also, the paragraph beginning at page 11, line 5 has been amended to correct a document number by changing “JP-A 11-839030” to “WO99/39030 (corresponding to US 6,252,031).”

No new matter is introduced in the specification.

Claim Rejections under 35 U.S.C. § 103(a)

Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuhmacher US '373 (US 4,310,373). (See paragraph "3." of the Office Action.)

Claims 7-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuhmacher US '373 as applied to claim 6, and further in view of Wilkinson US '137 (US 2002/0161137). (See paragraph "4." of the Office Action.)

Claims 1-2 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuhmacher US '373 in view of JP '847 reference (JP 60-224847). (See paragraph "5." of the Office Action.)

Claims 3-4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuhmacher US '373 in view of the JP '847 reference as applied to claims 1-2, and further in view of Wilkinson US '137. (See paragraph "6." of the Office Action.)

Applicants respectfully traverse and request that the Examiner withdraw the rejections.

The Present Invention

The present invention relates to a highly fusible polyurethane elastic filament which readily fuses even at low temperature and exhibits heat resistance, and a woven or knit fabric containing polyurethane elastic filaments in combination with other fibers. (See independent claims 1 and 6, for example.)

In accordance with the present invention, a highly fusible polyurethane elastic filament is obtained by a specific process using a specific material, for example. More particularly, the highly fusible polyurethane elastic filament according to the present invention can be obtained, for example, by melt-spinning a polymer synthesized from a both end isocyanate-terminated prepolymer prepared by the reaction of a polyol and a diisocyanate with (B) a both end hydroxy-terminated prepolymer prepared by the reaction of a polyol, a diisocyanate and a low molecular weight diol, wherein at least 50% by weight of the starting polyol is a polyether polyol.

When a blended woven or knit fabric which contains the highly fusible polyurethane elastic filament of the invention and non-elastic yarns is heat-set, heat fusion occurs at places where the polyurethane elastic filaments come into contact with the non-elastic yarns and at places where the polyurethane elastic filaments come into contact with each other, and thus a obtained fabric exhibits resistance to yarn slippage, corrugation, fraying, running, edge curling and slip-in, without any loss in tenacity.

Nonobviousness over the Combination of the Cited References

Schuhmacher US '373 discloses a polyurethane prepared by the reaction of (1) a diisocyanate or a mixture of diisocyanates, (2) a polyol or a mixture of polyols such as the polyester or polyether polyols having a molecular weight between about 500 and 5000, and (3) a mixture of low molecular weight diols having an average molecular weight below about 500 which function as chain extenders for the polyurethanes produced during the reaction. The preparation is carried out in a single step wherein all the materials are placed in one vessel as typically disclosed in the Examples.

However, Schuhmacher US '373 fails to teach or suggest the polyurethane elastic filament which is obtained by a specific process using two kinds of prepolymers with a specific content of polyether polyol and has the specific property of at least 50% retention of tenacity after the dry heat treatment at 150°C for 45 seconds at 100% extension.

Although Schuhmacher US '373 discloses merely and generally the use of polyether polyols, a specific amount of polyether polyol is not disclosed or suggested. In fact, Schuhmacher US '373 discloses only polyurethane obtained from polyester polyol (see, for instance, the working Examples of Schuhmacher US '373). Thus, the claimed polyurethane elastic filament of the present invention is quite different from that of Schuhmacher US '373.

Regarding Wilkinson US '137, the Examiner alleges that "Wilkinson teaches that obtaining thermoplastic polyurethane elastic filaments by reacting a both ended isocyanate-terminated prepolymer prepared by the reaction of a polyol and a diisocyanate with a both end hydroxyl-terminated prepolymer prepared by the reaction of a polyol, a diisocyanate and a low molecular weight diol (see paragraphs 0022-0024 and claim 10), wherein at least 50 wt% of the starting polyol is a polyether polyol that (paragraph 0035) produces polyurethane fibers having good tenacity and recovery (see abstract)." (see paragraph "4." of the Office Action.)

However, Wilkinson US '137 merely discloses a thermoplastic polyurethane elastomeric polymer made by a three-step process including: preparing a first poly(ether)urethane oligomer (or poly(ester)urethane oligomer) from polyol and diisocyanate; preparing a second poly(C₂-C₆ glycol)urethane oligomer from glycol and diisocyanate; reacting the oligomers in a reaction extruder; and pelletizing; melting the pelletized material and then spinning the melted polyurethane into elastomer fibers. Even if, as the Examiner alleges, Wilkinson US '137 might

suggest the use of hydroxyl group-ended polyether, there is no disclosure regarding the specific amount of the polyether polyol. Thus, the polyurethane of Wilkinson US '137 is also quite different from the polyurethane elastic filament of the present invention.

As explained above, what is obtained from the combination of Schuhmacher US '373 and Wilkinson US '137 would be, at best, polyurethane filament composed of polyester polyol and diisocyanate, which would be quite different from the polyurethane elastic filament of the present invention having both the specific melting point and the specific tenacity. Accordingly, there is no reasonable expectation of success and/or rationale based on the combination of Schuhmacher US '373 and Wilkinson US '137 for one skilled in the art to arrive at the polyurethane elastic filament of the present invention.

Further, the Examiner alleges that Schuhmacher US '373 discloses a fabric and that the fusible fabric of Schuhmacher US '373 can be used in making garments such as raincoats.

However, the fabric of Schuhmacher US '373 is composed of a polyurethane which is spun onto a carrier fabric and serves as an adhesive and a main body fabric to which the carrier fabric having polyurethane is bonded. After bonding, the polyurethane filament exists in one surface (surface to be adhered) of the fabric in Schuhmacher US '373. On the other hand, the fabric of the present invention is the blended woven or knit fabric using the polyurethane filament woven or knitted with other fibers. The polyurethane filament is fused at the crossover points, which exist all over the fabric. Hence, the fabric of the present invention exhibits tenacity or strength which is significant for an article of apparel.

Schuhmacher US '373 uses polyurethane as an adhesive, so that the tenacity and strength of the polyurethane filament is not assumed as important factors therein. Even though the

strength of the polyurethane filament can be adjusted, the fabric or garment with desired properties is not adjusted as long as the polyurethane exists only in one surface of the fabric as disclosed in Schuhmacher US '373.

In this regard, the Examiner states that the JP '847 reference teaches employing bondable elastic fibers in fabrics which also comprise other non-elastic fibers and bonding by melting and fusing the elastic fibers at crossover points.

The JP '847 reference discloses a warp knit fabric comprising a main fabric and elastic yarns, wherein the main fabric is knitted with non-elastic yarns and the elastic yarns are inserted therein to contact and crossover each other at more than one point, and the elastic yarns are fused with each other at the contact and crossover points.

However, the weaving or knitting technique of the JP '847 reference is fundamentally different from the spun technique of Schuhmacher US '373. Thus, the skilled person in the art would not have been motivated to combine the JP '847 reference with Schuhmacher US '373.

Therefore, even if Schuhmacher US '373, the JP '847 reference and Wilkinson US '137 are combined, such a combination fails to teach or suggest the fabric using the specific polyurethane elastic filament of the present invention. Therefore, a *prima facie* case of obviousness cannot be established based on the combination of the cited references. Further, the combination of the cited references also fails to teach that the specific fabrics of the present invention are resistant to such effects as yarn slippage, corrugation, fraying, running, edge curling and slip in.

As explained above, there is no reasonable expectation of success and/or rationale based on the combination of the cited references for one skilled in the art to arrive at the present

invention. Thus, the present invention is not obvious over the combination of the cited references. Applicants respectfully request that the Examiner withdraw the rejections.

CONCLUSION


Based upon the amendments and remarks presented herein, the Examiner is respectfully requested to issue a Notice of Allowance clearly indicating that each of the pending claims (*i.e.*, claims 1, 2, 5, 6 8, 10-23) are allowed.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Toyohiko Konno (Reg. No. L0053), at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

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